

PATENT COOPERATION TREATY

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INTERNATIONAL PRELIMINARY EXAMINATION REPORT
(PCT Article 36 and Rule 70)

Applicant's or agent's file reference DAS/P/76134.WO/B	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/B 03/05390	International filing date (day/month/year) 25.11.2003	Priority date (day/month/year) 26.11.2002
International Patent Classification (IPC) or both national classification and IPC H04L12/403		
Applicant MELEXIS NV		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 5 sheets, including this cover sheet.

This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 4 sheets.

3. This report contains indications relating to the following items:

- I Basis of the opinion
- II Priority
- III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV Lack of unity of invention
- V Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI Certain documents cited
- VII Certain defects in the international application
- VIII Certain observations on the international application

Date of submission of the demand 17.06.2004	Date of completion of this report 13.04.2005
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**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. PCT/IB 03/05390

I. Basis of the report

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

Description, Pages

1-13 as originally filed

Claims, Numbers

15-24 as originally filed
1-14 received on 14.10.2004 with letter of 12.10.2004

Drawings, Sheets

1/3-3/3 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- the language of publication of the international application (under Rule 48.3(b)).
- the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- contained in the international application in written form.
- filed together with the international application in computer readable form.
- furnished subsequently to this Authority in written form.
- furnished subsequently to this Authority in computer readable form.
- The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- the description, pages:
- the claims, Nos.:
- the drawings, sheets:

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5. This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	1-24
	No: Claims	
Inventive step (IS)	Yes: Claims	1-24
	No: Claims	
Industrial applicability (IA)	Yes: Claims	1-24
	No: Claims	

2. Citations and explanations

see separate sheet

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1 Reference is made to the following documents:

D1:EP0893767
D2:WO0237923
D3:GB253448
D4:US4847834

1.1 According to the drawings of the present invention "the pull up current source" is coupled to the pull up resistor via a diode. A current can therefore not be forced from the current source through the pull up resistor. Instead, the current is forced through the **series resistors Rac** of the non selected modules towards the master. Therefore, the wording of **claim 23** "forcing a pull up current through the pull up resistor" is not clear and consistent with the description(drawings;page 11 line 12). Therefore, the requirements of Article 6 PCT are not fulfilled.

2 The present invention relates to a LIN bus system and a method of configuring a LIN Bus system according to the features of the independent claims 1 and 23 respectively.

2.1 The document D3:GB2353448 represents the closest prior art and discloses a daisy chain bus system. The system comprises a master and non-configured nodes. In order to configure the nodes, the master forces a current through a series resistor of the modules. By measuring the voltage on the series resistor each module can deduce its position in the daisy chain. However, the master provides also an address voltage for comparing against the measured voltage. In contrast to the application D3 does not disclose counter means.

2.2 In a LIN Bus System the attached modules sometimes need to be replaced. In order to establish a unique identifier for each module a daisy chain with a series resistor is used. A current is forced through a series resistor and each non-configured module should measure a voltage across the resistor. However, due to tolerances in the resistor this method is prone to faulty configurations. The technical problem to be solved in the invention consists in how to determine in a

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two wire bus the position of each module.

The present invention solves the above-mentioned technical problem by counter means. Each time a non-configured module is configured by the master, the remaining non-configured modules increment their counters. This has the advantage that the system can be build cost effective, since the resistors can have tolerances and the voltage need not to be measured with high accuracy.

- 2.3 Therefore, claims 1 and 23 meet the requirements of Article 33(2) and 33(3) PCT.
- 2.4 Claims 2-22 and 24 are dependent on claims 1 and 23 and meet therefore also the requirements of the PCT with respect to novelty and inventive step.
- 3 In order to meet the requirements of Rule 6.3(b) PCT, any amended independent claim should have been properly cast in the two-part form, having a pre-characterizing portion with those features known in combination from document D1 and D2.
 - 3.1 The features of the Claims should have been provided with reference signs placed in parentheses (Rule 6.2(b) PCT).
 - 3.2 The cited document D1 and D3 should have been acknowledged and briefly discussed in the opening part of the description (Rule 5.1(a)(ii) PCT), so as to put the invention into the proper perspective.

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CLAIMS

1. A reconfigurable module having means for being configured with an ID and also having embedded within it at the manufacturing stage a fixed unique Chip Identification Code (CIN) for use during a configuring operation.
- 5 2. A reconfigurable module as claimed in claim 1 wherein module is a module compatible with the LIN bus Standard.
3. A reconfigurable module as claimed in claim 2 wherein said module has two LIN Bus interface pins connected by a series resistor.
4. A reconfigurable module as claimed in claim 3 wherein the series resistor is a 10 1 ohm resistor.
5. A reconfigurable module as claimed in any preceding claim wherein said module further comprises a pull up resistor and a pull up current source for forcing a pull up current through the pull up resistor.
6. A reconfigurable module as claimed in any one of claims 2 to 5 wherein if a 15 number of said modules are connected in a daisy chain manner standard LIN Bus arbitration rules apply for selecting one module from the daisy chain.
7. A reconfigurable module as claimed in claim 6 wherein said pull up current only flows whilst said module is selected.
8. A reconfigurable module as claimed in any preceding claim wherein said 20 module further comprises a position counter, which may be incremented to indicate the position of the module in a daisy chain.
9. A reconfigurable module as claimed in any preceding claim wherein said module further comprises a random code generator for generating a random

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code of a plurality of bits in length to identify the module as an alternative to the CIN code.

10. A LIN bus system comprising a plurality of modules linked to a LIN bus along which electronic data or instructions can be sent to and from each said module, at least one of said modules being non configured and having no unique identification address associated therewith, said at least one module having a unique code associated therewith, said system further including configuration means which interrogates said modules and detects the unique code of said at least one non-configured module and transmits a configuration signal to the module to configure the module, each said non configured module including counter means which is incremented each time a non configured is configured, said counter of each non-configured module, once configured, providing a unique code which is indicative of the position of the module in the system.
11. A LIN bus system as claimed in claim 10 wherein the at least one module having a unique code associated therewith is a reconfigurable module as claimed in any one of claims 1 to 9.
12. A LIN bus system as claimed in claim 11 wherein said unique code is a CIN.
13. A LIN bus system as claimed in claim 11 wherein said unique code is a randomly generated code.
- 20 14. A LIN bus system as claimed in any one of claims 10 to 13 wherein said LIN Bus system comprises a plurality of non-configured reconfigurable modules connected together in a daisy chain manner.

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15. A LIN bus system as claimed in claim 14 wherein a configuration sequence is performed to configure each of the plurality of non-configured reconfigurable modules.
16. A LIN bus system as claimed in claim 15 wherein during a configuration sequence the bus master transmits a configuration request and all non-configured reconfigurable modules respond by transmitting a reply consisting of their unique code.
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17. A LIN bus system as claimed in claim 16 wherein standard LIN bus arbitration rules apply, wherein active states win over recessive states, and one non-configured reconfigurable module will thus win the arbitration and become the 'selected module'.
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18. A LIN bus system as claimed in claim 17 wherein the selected module then forces a current through its pull up resistor.
19. A LIN bus system as claimed in claim 18 wherein non-selected non-configured reconfigurable modules can monitor this current through their series resistors and thereby determine that a selected module is responding.
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20. A LIN bus system as claimed in any one of claims 10 to 19 wherein each non-configured reconfigurable module incorporates a position counter incremented on each occasion that a selected module responds with a forced current.
21. A LIN bus system as claimed in claim 20 wherein the position counter on a particular non-configured reconfigurable module is not incremented when the particular non-configured reconfigurable module is itself selected
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22. A LIN bus system as claimed in claim 21 wherein the position counter on a particular non-configured reconfigurable module is not incremented after the particular module has been selected.

23. A LIN bus system as claimed in claim 22 wherein once all un-configured 5 extended capability modules have been selected each will have a position counter showing a unique position for that module within the daisy chain and this unique position counter value can then be used to select a module and configure it for use in the system.

24. A method of configuring a LIN Bus system according to the second aspect of 10 the present invention comprising a plurality of said non-configured reconfigurable modules connected in a daisy chain manner comprising the steps of: transmitting a configuration request from a bus master; selecting one module from the daisy chain by standard LIN bus arbitration rules; forcing a current through the pull up resistor of the selected module; incrementing the 15 position counter of each module within the daisy chain that is not currently or previously selected; repeating the above steps until each module in the daisy chain has been selected, the position counters for each module thus showing its unique position in the chain; and using the unique position counter value to select and configure a desired module or a plurality of desired modules.